Citrus Industry

Little Sissy MacCalla and her big grapefruit form such an appealing picture that thousands of newspapers are using it.

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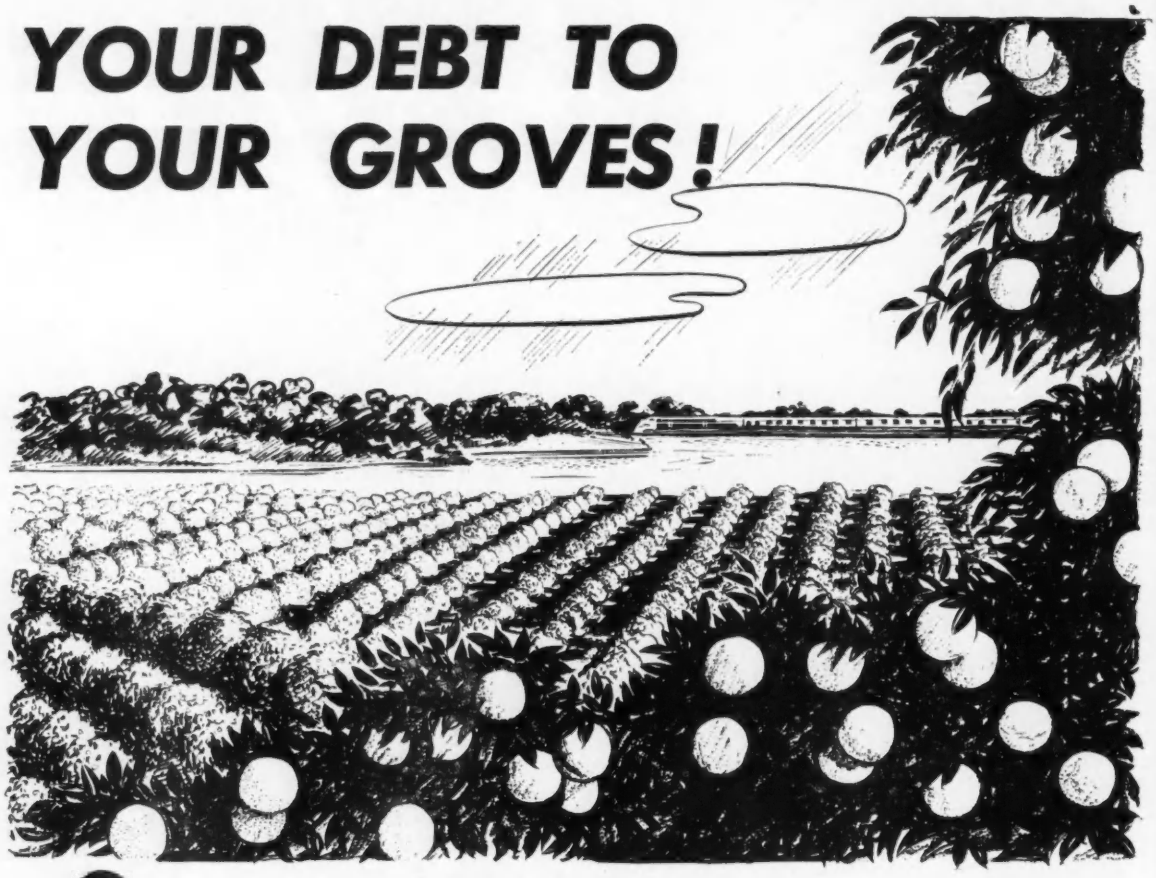
Vol. 27, No. 11 November, 1946

YOUR DEBT TO YOUR GROVES!



OUT there in your groves stand your mute but willing servants—your citrus trees. They're fixed in the ground, yes, but they're living, breathing workers just the same.

They don't ask much of you, these workers of yours. Give them good food, cultivation, sensible spraying and dusting . . . and they'll work night and day, year in and year out, to make a profit for you.

During the last few years your groves have produced enormously. And at a time when the vitamin and mineral-rich food values of citrus were greatly needed by a hungry world. They have contributed food for humanity, profits for you.

You owe a debt to your groves . . . a debt that can be repaid in the simple, easy terms of good food and good care.

The best and most dependable way to repay this debt and to insure future high production from your groves is to feed them well with IDEAL Fertilizers. For more than a half century IDEAL Brands have set the standard of excellence for Florida citrus and vegetable growers. This standard is as jealously maintained today as in the past 53 years.

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WILSON & TOOMER FERTILIZER CO. JACKSONVILLE, FLA.

IDEAL FERTILIZERS

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JACKSONVILLE - FLORIDA

Progress Report On Chemical Weed Killer...

T. W. YOUNG
Associate Horticulturist, at Meeting Florida State Horticultural Society

During the past year a new type of active ingredient for herbicidal sprays was introduced by several commercial concerns. This material is the organic compound 2, 4-dichlorophenoxyacetic acid, now generally abbreviated to 2, 4-D. Herbicides containing 2, 4-D seem to have fewer objectionable features than those containing such materials as the arsenicals, sodium chlorate, and the more recently introduced dinitro compounds. They are reported to be non-poisonous to animal life at herbicidal concentrations. They do not create a fire hazard as does sodium chlorate. The roots of perennial species are more effectively destroyed. When properly applied the subsequent germination of seeds in the soil of treated areas is not inhibited to so great a degree nor for a prolonged period. The 2, 4-D herbicides are cheaper.

This compound belongs to the group of growth regulating substances known as plant hormones. Work with these compounds on plants has been directed primarily towards increased usefullness by stimulating the rooting of cuttings and transplants, stimulating the setting of fruit, preventing the premature dropping of fruit, and developing fruits which were seedless. For the desired effects in these respects the growth regulating substances have been applied as very dilute solutions, about 20 to 40 ppm. For several years, however, it has been known that considerably greater concentrations of some of these hormones killed many species and varieties of plants. Death did not result from a caustic action on the foliage nor a poisoning or toxicity, in the ordinary sense, of cell substance. Evidently certain unfavorable growth responses were induced which eventually resulted in death. Plant physiologists have been in disagreement as to the actual cause of death since the exact functions of plant hormones and hormone-like substances in plants are, as yet, imperfectly understood. Regardless of the manner of killing, these new materials seem to offer unique possibilities for a selective herbicide since a great number of noxious broad-leaved species were killed by a spray which affected but few of the grasses. Among the most potent of these compounds was 2,4-D at concentrations from about 500 to 1500 ppm in the spray solution. Up to the present time a satisfactory kill (90%) has been reported for it on 125 to 150 different species, partially satisfactory on about 50 more, with 60-some species, including many grasses reported being resistant.

Different species responded in different ways to treatment with 2,4-D. Most susceptible broad-leveled species, however, reacted violently and in a more or less typical manner. This was not a quick dying of above-ground parts as with conventional weed-killers. Within a few hours after treatment in warm weather there was a curling or bending (nastic movements) of the leaf blades, petioles, and tender stems. In a few days the leaves became chlorotic. Within about a week the leaves were dead and the stems dying, often splitting longitudinally. By this time the underground parts had commenced to swell and split. In about 2 or 3 weeks the roots became soft and soon died. The few grasses affected were mostly in the seedling stage. This signified the selective nature of 2, 4-D as a herbicide.

The first interest in 2, 4-D at the Citrus Experiment Station was because of the possibilities it seemed

(Continued on page 14)

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Putting this idea to work, under the guidance of Swift's Growers Advisory Service has meant greater success . . . greater profits for hundreds of Florida citrus growers.

Now we are expanding our Growers Advisory Service. We are adding to our staff well qualified university trained men. They can serve you in the practical, thorough way that leads to increased profits for you.

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If you are not familiar with Swift's Growers Advisory Service, investigate it soon. You'll be pleased at the thoroughness of the service and the scientific approach to your particular problem. We believe that it is not enough to make plant foods of the highest quality for citrus tree feeding . . . we must see that these plant foods are applied at the right time, in the right way and in the right combinations. Swift Growers Advisory Service does just that! The service is available to you without extra cost.

Swift & Company

Plant Food Division

Bartow, Florida

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Representing no special interest

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The Significance Of Water Conservation In The Agricultural Development Of South Florida

R. V. ALLISON*
Vice-Director In Charge, Everglades Experiment Station At Meeting Of Florida State Horticultural Society

The importance of water control and conservation in the development of South Florida's agriculture, as well as several other very important aspects of the economy of this section of the state, has been so much emphasized and so frequently reviewed during the past few years that a further discussion of the subject at this time would be without very much point except that, during recent months, things have begun to happen down here, so to speak.

Before reviewing for you some of the things that have happened and are happening, however, let me remind you that they have not just decided to come about of their own free will and accord. First of all there is the great, driving interest of the Governor and his entire Official Family in Tallahassee who probably have this problem of water conservation more constantly before them than any other single consideration that could be mentioned at this time.

There is also urgent interest of each and every member of the Board of Commissioners of the Everglades Drainage District who, under the fine leadership of Chairman Hilsabeck, are using this question of water handling and conservation as a veritable pivot around which each and every thought and plan pertaining to any phase of the general program of the District is obliged to turn for official security

In a more local way mention also must be made of the splendid efforts that are being extended by the Resources Development Board of Palm Beach County under the untiring leadership of President P. P. DeMoya and Manager R. J. Blank in the direction of organizing local maintenance units for a more effective handling of water supply problems. The first two units, by way of a trial effort, are being established in the areas to be served by the West Palm Beach and Hillsboro Canals as the plans develop for the further improvement of these two important arterials. Right in this connection I wish I could tell you of the fine hearing pertaining to flood control and navigation on these two canals that was held this afternoon in Belle Glade under the sympathetic supervison and chairmanship of the District Engineer, Col. A. B. Jones. The need for effective flood control in this important agricultural area for the protection of a number of thriving communities as well as crops, livestock and other vested interests was very strongly urged, the scale and nature of some of the principal works as well as the purpose which they are to serve being presented as forceful argument for the active participation of the U. S. Engineers Corps in the planning and development of the over-all program. Aside from testimony given by a large number of individual growers and organizations, a preliminary draft of the plans for the Hillsboro and West Palm Beach Canal Units were presented by Everglades Drainage District Engineers, Lamar Johnson, for review and study by Col. Jones and his staff. The support of a large percentage of the landowners in each of the proposed maintenance districts for these plans was presented to Col. Jones in the form of a resolution from each district asking for the active guidance and help of the

*Paper prepared for presentation at the Annual Meeting of the State Horticultural Society, Miami, April 30, 1946.

Federal Government in the broader flood control phases of the program for both areas and pledging whole-hearted assistance in the development of such plans as may be formulated.

In briefly reviewing the current progress that is being made in the solution of the water conservation problem in South Florida mention also must be made of the effective cooperation that has developed between Dade County Authorities on the one hand and officials of the Everglades Drainage District on the other in which the whole question of municipal water supply is being clearly and effectively analyzed and studied. That progress is being made is best indicated by the fact that both agencies are looking at both sides of the question, namely, municipal requirements and agricultural values. When this sort of approach is used and the effort is held on an earnest, purposeful basis it is practically certain that a solution will be arrived at which will be satisfactory to all concerned.

Soil Conservation

There can be no doubt in the minds of any who are at all conversant with the general problem that the greatest significance of water control and conservation from the agricultural standpoint lies in the conservation of our soil since it is only through the most judicious use of practically all the water that is available throughout the year that this can be accomplished to any worthwhile extent. Naturally if we do not conserve our organic soils to the very best of our ability we do not have much of a basis for discussing their place in the long time agricultural development of this section of the State.

Occasionally we are asked why we have waited so long to stress the soil conservation problems in the Everglades. Our simplest reply is to refer to the first bulletin, Fla. Expt. Station, No. 190, published by the Everglades Station in 1927 from which I quote as follows:

"One of the most important problems from the agricultural standpoint of peat soil in general is that of shrinkage and excessive drying as a result of drainage. If the Everglades is to develop into a durable agricultural project more importance should be placed upon this than any other single consideration."

"In order adequately to protect peat soils against fire and conditions of excessive drought, absolute water control will be necessary and this should be the aim in starting an agricultural development of this nature. In the case of excessive drought, even in the absence of fire, such conditions tend to accelerate natural oxidation processes and result in a further net loss of the material."

"From this standpoint in particular the whole project is not a problem for the engineer alone. It is rather one in which agricultural research must play an important part in developing systems of cropping and rotation that will coordinate with the condition and movemen of the water table in such a way as to afford maximum protection against this loss. To those who have a broad, sincere interest in the development of this area as a state resource, the matter of subsidence and water control can not be over-emplasized. Indeed, we have need but to refer to the experience of the English upon the

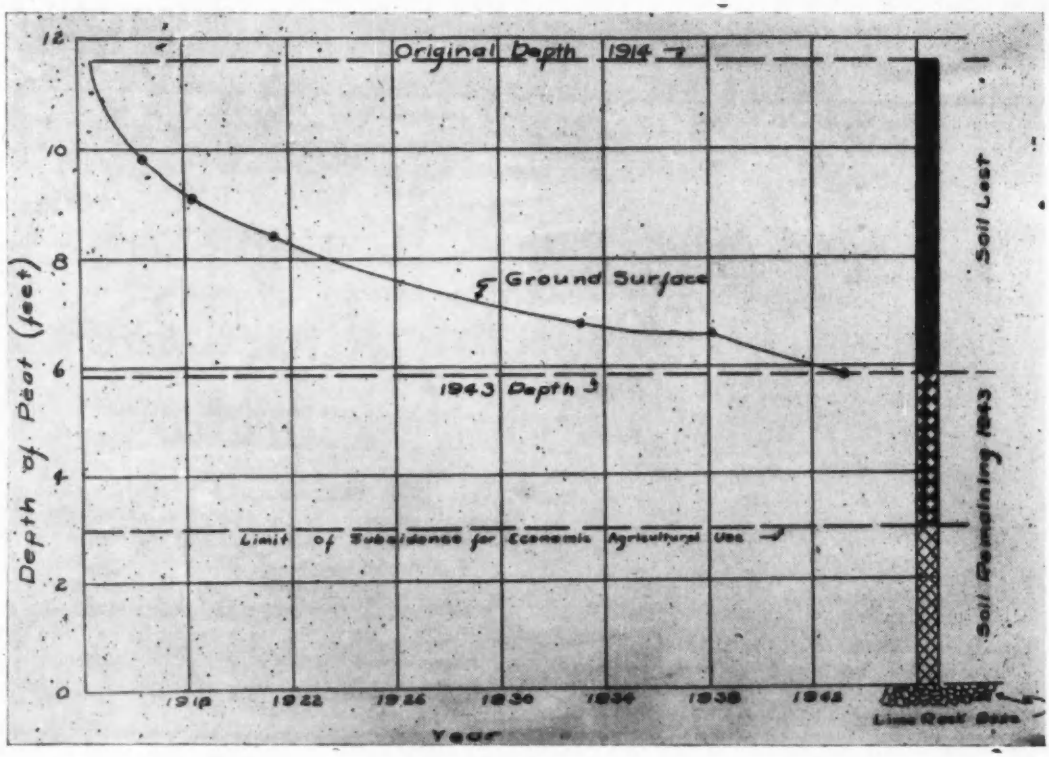

Figure 1. Graph showing rate of surface subsidence on Okeechobee peaty muck since 1914 at a location about four miles south of South Bay. The rather sharp, downward trend during the last few years of record is presumably due to increased cultivation as well as the occasional fires that took place during the interval of those measurements.

Fenland of that country where, with time, strata of peat several feet thick have almost disappeared and drainage lines and cultivation are now largely in the clays with which the peat was formerly underlaid. Since the peat soils in the Everglades area are underlaid with limestone rock or by sand over lime rock, the need for caution in their unnecessary exposure is readily seen."

That there is grave need for soil conservation measures of the most heroic type in the Everglades area in particular is fully indicated by the physical fact of soil dissipation under present conditions of handling which is becoming so grossly apparent that it no longer can be conveniently ignored. Thus in certain sections of the upper Glades we have records to show that the surface elevation of the land is from 4 to 6 feet lower than it was in 1914. While a certain percentage of this shrinkage in the soil mass and consequent surface subsidence was unavoidable in bringing land of this type into cultivation, a quite considerable part of it would have been prevented by a more careful handling of the water table in and on the land in the interest of slowing down natural oxidation and preventing open burning which has occured much too frequently in the past.

This whole question of soil conservation in relation to our organic types has been so fully covered in two recent volumes of the Proceedings of the Soil Science Society, IV-A (1942) and V-A (1943) that it should not be necessary to go into it at this time except in a very general way.

In the first place the thorough geological studies of this extensive area that have been quite fully reported in the above volumes show very clearly why our water control problems become more difficult as we move southward down the peninsula from Lake Okeechobee. Thus as we pass from the comparatively tight Fort Thompson Formation onto the highly porous Miami Oolite or on to the even more permeable Tamiami limestone, which serve as foundation material for what is left of the original blanket of peat, we encounter an entirely different and much more difficult condition under which to control water levels due to the natural inability of these types of rock to hold water against seepage. As a matter of fact it is probable that this highly permeable condition in the supporting formation has been as responsible as any other one factor for the much shallower depth of organic material that has developed over this whole southerly section of the Everglades due to the substantially lower average stage of the water level that has been maintained through the centuries during which the deposit of plant material has been laid down.

In any event recent surveys have shown vast areas of peat land to the south to be so shallow in depth, as the result of failure in the original formation or due to subsequent burning, as to be very largely without value from the agricultural standpoint. This, of course, should not be taken to mean that some one could not set up a temporary operation on some section of this extensive area and succeed with a short time crop or two while the water table happened to be satisfactory for the purpose. It does mean that the soil is too shallow and the rock too porous to justify the cost of putting in extensive water control facilities on either large or small areas which would require several years of normally successful operation to amortize but which could not possibly be successful in protecting the investment against either excesses or deficiencies of water. It is this type of area which we are looking to as storage basins for water and the development of wild life refuges.

The trends of soil dissipation and subsidence in the Everglades are serious enough on the best of our lands to challenge everything we can put into an effort at prevention or even of substantially slowing down. Only recently I was asked by a correspondent from South Florida regarding this soil conservation trend on organic soils and my reply was that it constituted one of the most perfect examples that could be found anywhere of the old saying to the effect that "you can't eat your cake and have it too." In this instance the paraphase would suggest that you can't farm this type of soil and keep it indefinitely under any circumstances though the manner in which the farming is done especially with respect to the handling of the water supply, will most certainly determine how fast the soil will disappear. That is to say with a proper handling of the water supply the life of these soils can be very greatly extended. This subsidence trend is very well shown in the graph of Figure 1 which not only clearly indicates the trend of surface subsidence since 1914 at a certain point in the upper Glades

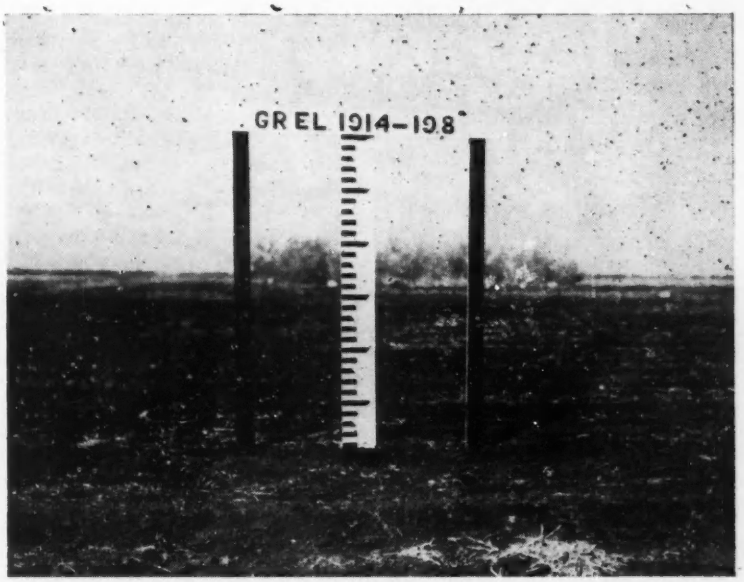

Figure 2. Temporary benchwork set up at the time of the inspection trip through the heart of the Everglades which was arranged to follow (3-18-43) the Interin meeting of the Soil Science Society of Florida which was held in Belle Glade on March 17th, 1943, for a discussion of Everglades problems. This shows that the ground elevation at this available point in 1914, according to the best engineering data available, was nearly six feet higher than at the time the picture was taken in 1943.

but also the depth of muck remaining in relation to a proposed practical depth upon which agricultural operations would be feasible and sound. The photograph of Figure 2 shows at a glance the hard facts of surface subsidence at a point quite close to the profile from which the graph of Figure 1 were obtained.

The recently completed soil, geologic and topographic surveys which have been carried out cooperatively by the Soil Conservation Service and the U. S. Geological Survey with the Florida Experiment Station and which are now being prepared for publication in the form of a fully integrated report is the most important facility that has been provided to date for use as a physical basis for planning a broad, comprehensive water control program for South Florida. In these surveys we virtually have a series of portraits of this section of the State which will be found practically indispensible to any and all types of planning having to do with water control or the use of the land.

Thus through the soils map that is based upon the field work of the soil survey, we will know for the first time what soils we have, where they are, and how much of each type we have. Through this map, when available, we will doubtless find that we have upwards of ¼ million acres, perhaps more, of excellent mineral soils of the Davie fine sand and closely related types which would be admirably suited to citrus and a number of other tree crops, if and when needed, with obvious temperature and moisture advantages, that is if water conservation practices are planned and executed in accordance with the general requirements of the vast area of mineral and organic soils lying within the Everglades system.

While our mineral soils in this section of the State also offer great opportunities for pasture and livestock work and the culture of a wide variety of vegetables as well as various subtropical fruits in certain limited sections, the same care and judgment must be used in the relation of all of them to water control and conservation if success is to be attained. The importance of research and planning in connection with the mineral soils of this section of the State can not very easily be over-emphasized for it obviously is upon them that our agricultural production must largely depend in the not too distant future.

Water Supply

The question of water supply, whether for general agricultural use or for domestic purposes, has become a critical one not merely for South Florida alone but for the entire State. Neither is the need for water control one that applies to a particular part of the year but, instead, calls for a stabilized, well regulated condition throughout the year that will be so comprehensive in its development as to give just as much protection as possible to the abnormally dry years as well as the abnormally wet years. These, taken together, usually form cycles of rainfall extending over several years. In undertaking such a program we are always confronted with opposing groups of what might be referred to as "wet" and "dry" proponents who are ever ready to deny the arguments of the other group when they happen to be enjoying their particular end of the cycle. However, our outlook is much brighter today than ever before in that more and more people are beginning to see the **whole** picture and are realizing that the only way to prepare for the dry end of the cycle is to do the right thing while there is water to work with—water in abundance or even in an excess —and vice versa for the wet end of the cycle. It is this basic, fundamental type of planning that the U. S. Engineer Office has in mind in the present series of flood control navigation hearings which are being held throughout the Kissimmee Valley and Everglades and I am bound to say that the amount of public interest that is lining up behind this approach is most encouraging.

In our water supply problem over this extensive flatland area that we call "South Florida" we have really very serious need for reserve areas or supply areas other than that which might be developed by holding Lake Okeechobee at higher average levels. Places, in other words, to put water when we have too much which automatically become definite sources to draw from in times of need. This is the simplest possible alternative for dumping water into the ocean just because we have too much of it, a disposal that should be absolutely avoided except in times of real emergency.

Fortunately we have extensive areas of land in the general Everglades area which, because of their physical characteristics and underlying formations, as pointed out above, can be argued as useful for little other than reservoir or water reserve areas. Reference is to such sections as the island and slough country west of Lake Worth, Boynton and Delray which lies beyond the confines of the Lake Worth Drainage District, or extensive sections from the central part of the Glades south to the Tamiami Trail and beyond. To say that these sections are useful only as water reserve and wild life areas is not to condemn their existence, location or usefulness in any way for once the real value of water is appreciated they become just as important for this purpose as for any other. As a matter of fact I have said many times that if every square foot of land in the Glades were as good as the best of any of it we would still have to create extensive water reserves for reasons that are rapidly becoming quite painfully obvious to all of us. In other words we permit entirely desperate water supply situations to create themselves under present conditions by simply allowing the water to seep away for want of judicious control. Try and imagine, if you can, what our fresh water supply would be like if we were to undertake to drain and develop for one purpose or another even one half of the total area of what we refer to as the Everglades. The situation would immediately become much worse than anything we have ever experienced and definitely block future development of many kinds toward which we are looking with such great expectations at the present time.

The fact that we do have extensive areas of soils that are definitely inferior from the agricultural standpoint thus doubtless saves us from many a headache in trying to decide which areas should be used for water reserves or drainage areas and which for agricultural purposes. In spite of all the worry that has gone before, there is real pleasure to be found in all this effort at planning in that the proper, overall handling of our water resources along the lines that have been so much discussed in the past has several advantages, a whole circle of advantages, in fact, besides soil conservation and stabilized sources of municipal water supply. Among them is, of course, a constant source of irrigation water of which such important agricultural areas as the Lake Drainage District,

urgently in need for some time. Fortunately the location and distribution of the water reserve or drainage basin areas that have been proposed is such as to work in very well with practically every one of the several benefits and advantages arising out of this broader handling of the entire area that are referred to in this discussion.

Amelioration of Winter Temperatures

For instance much has been said about the influence of exposed bodies of shallow water such as would be involved in these reserve areas upon winter temperatures. Although no very adequate studies have been made of this influence we have, nevertheless, quite a considerable amount of evidence to indicate that this effect may not only be worth while but perhaps very much worth while.

Thus in early March of 1932, when Lake Okeechobee was being held very low for the convenience of construction work on the levee and the water in the open Glades was at least 18 inches below the surface of the land, air temperatures fell as low as 9 degrees F. and some instruments went as low as 6 degrees F. at a point about 15 miles out in the Glades, known at that time as Shawano Plantation. The local circumstances surrounding these readings were a dry, highly fibrous top soil with a deep covering of dead weeds and grass that had been killed by earlier frosts. However, at the Everglades Experiment Station on that same night, a location that is about ten miles nearer the Lake and in the midst of a moderately extensive cultivated area, readings of 30-32 degrees F. were recorded. At another time when the same cultivated area more remote from the lake was surrounded by water and a cold wave came down from the northwest we experienced frost at the Experiment Station while the outlying area that had such a low temperature before had no frost at all.

This same general relationship is indicated by more recent observations made last winter (1944-45) by Mr. James W. Milligan, Meterologist for the U. S. Weather Bureau stationed in the Everglades District. Mr. Milligan's summarization of the situation is quoted herewith from his report on horticultural protection work for the season which has just been completed.

"As an example of the modifying influence of water coverage to the south, the Shawano Plantation station, fifteen miles southeast of the Lake, experienced one of its mildest seasons, the temperature reaching 32 degrees on December 1. During the same cold spell, the "warm", Bean City station, within a mile of the Lake, also recorded 32 degrees. F. On January 19 the Bean City station recorded 30 degrees F, but no freezing temperature occurred at Shawano. Volunteer beans growing ten to fifteen miles from the Lake sustained no damage on January 19, while temperatures as low as 29 degrees were recorded in the warm lands adjacent to the Lake in the Pahokee area. The moderately cold Okeelanta station, six miles from the Lake, recorded no freezing temperatures during the entire season. A similar situation prevailed on the Lower East Coast which experienced one of the warmest seasons on record, the only 32 degrees F. temperature of the season occurring on February 25, after the uncultivated saw grass lands to the northwest in the Glades had dried up."

It would seem that the above indications are sufficiently definite to justify rather liberal expectations as to the effects of extensive rewatered tracts back in the Everglades on the winter temperatures of the Coastal resort cities; also on such important production areas along the East Coast as the Fort Pierce area, Lake Worth Drainage District and the extensive farming areas south of Miami. In any event the opinion is ventured that, in this relationship alone, there exists a benefit that may be worth very nearly as much as the entire water control program might cost, quite aside from the many other advantages accuring from the availability of adequate supplies of water.

Wild Life Protection

In appraising the varied and numerous benefits arising out of an improved water conservation program for South Florida we should not regard its value to wild life propagation and protection as among the least important whether in the several areas to be devoted to parks and government controlled refuges or in the extensive hunting preserves for which Florida has become well known, most of which, however, can stand a considerable amount of improvement. In the instance of the proposed Everglades National Park, for instance, there would seem to be a very definite need for an improved water supply if we are to realize the fine purposes for which this area is to be dedicated since wild life can not and does not develop without a reasonable supply of food. Natural food supplies, of course, do not develop in abundance without at least a reasonable supply of water, a condition that is inseparably related first, to holding the water on the land that falls there and secondly in supplementing this supply just as far as possible by overland flow from the north or by delivery thru a series of well planned canals constructed in part for passing surplus water down to these areas.

Canal Maintenance

Unfortunately once a canal is fully planned and its cross section completed the problem of its performing up to calculated capacity is only well begun. It has been realized for some time that one of the greatest enemies of water control systems in this tropical section of

(Continued on page 11)

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ORANGE PRICES TAKE SLUMP

The recent slump in orange prices on the auction markets was not wholly unexpected by the trade, although the extent of the slump was rather surprising. With auction receipts of a million boxes in a single week this early in the season, some recession in prices was to be expected. Added to this rather excessive volume was the fact that a very material percentage was composed of the extra small size, 288s. Then, too, at the time of the slump, the weather in most consuming centers was unseasonably warm, a factor which always plays a part in the purchase and consumption of oranges.

Curtailment of shipments, withdrawal of the smaller sizes from the market and more seasonal weather have acted to somewhat stabilize the market and there has been some advance from the lowest prices ruling at the ebb tide of prices.

Growers and shippers generally believe that the worst of the trade reaction has been passed and that from now on better prices may be realized. But with a citrus crop aggregating more than one hundred million boxes in prospect, Florida citrus growers should take every precaution to protect the market and to take every advantage to secure the maximum price for one of the best quality crops ever produced in the state. Eternal vigilance will be the price of a profitable season.

CAUSE FOR CONGRATULATION

Florida citrus growers, in common with Florida citizens generally, have cause for rejoicing over at least two results of the recent election:

First, that Hon. Spessard L. Holland, himself a citrus grower and a warm friend of the state's leading industry, was so overwhelmingly elected to the United States Senate; and second, that the two proposed constitutional amendments, Nos. 4 and 5, with their threat to the material interests of the industry, were so positively rejected by the voters.

With Senator Holland, now serving by appointment to fill the vacancy caused by the death of the late Senator Andrews, and now elected for a full term, Florida citrus growers will indeed "have a friend at court."

The defeat of the two amendments assures that the work of the Florida Citrus Commission in promoting the welfare of Florida citrus growers will go on unhampered by legislative restrictions which would have seriously crippled its efficiency.

LITTLE HURRICANE DAMAGE

Florida citrus growers have again been fortunate in escaping serious loss from winds of hurricane force. In most sections of the "citrus belt" there was practically no damage, while in those sections visited by the highest winds, loss is estimated by experts to have been no more than five percent to grapefruit, and none save thorn pricks to oranges. As in other recent storms, the heaviest damage was sustained by groves in the southern end of the "Ridge" section.

TRISTEZA COULD BE PERIL

Dr. A. F. Camp, vice-director in charge of the Florida Citrus Experiment Station at Lake Alfred, who has just returned from a trip to South America for a further study of tristeza, a disease threatening the citrus industry in Brazil and Argentina believes that the disease holds a potential threat to the citrus industry in the United States.

On his trip through the two South American republics, he discovered 3,500,000 trees that had been killed by the disease in one small area. The disease has gained headway to an alarming extent throughout the territory visited, attacking trees budded on sour orange root stock.

The purpose of Dr. Camp's recent trip was to locate a laboratory for the study of the disease and its prevention. Concordia, in Argentina, has been chosen as the site of the laboratory at which extended study will be made by a group of scientists headed by Dr. E. T. duCharme of the Citrus Experiment Station, assisted by South American and other United States scientists. The laboratory will be set up about December first.

SMALL SIZE ORANGES BANNED

The shipment of oranges of the 288 size, which had been under the ban earlier in the season, but which were permitted for a three-week period, has again been placed under the ban by the Federal Marketing Agreement Committees. The action was taken by practically unanimous vote of all grower and shipper interests.

To what extent the shipment of the smaller size influenced the recent slump in prices cannot of course be definitely determined, but with a record crop of medium and large size oranges on the trees, and with quality seldom if ever before attained, it was felt by both growers and shippers that the smaller size should be kept off the market.

Florida citrus groves were never in better general condition than at the present time, and never carried a finer crop of quality fruit.

THE SIGNIFICANCE OF WATER CONSERVATION IN THE AGRICULTURAL DEVELOPMENT OF SOUTH FLORIDA.*

(Continued from page 9)

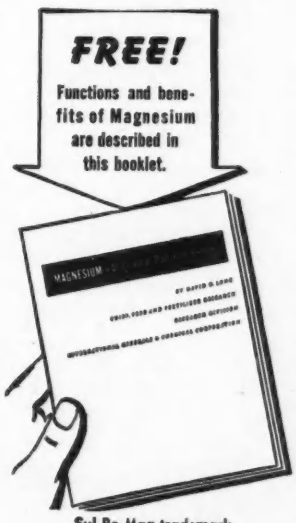
the State is the profusion of natural growth that immediately starts in artificial waterways, once they are developed. Among plants of this type some of the worst are the water hyacinth and water lettuce and some of the under water growths such as "niggerwool", various elodeas, eel grass and others.

During the past few weeks we have been testing a number of different formulations, all involving the hormone 2,4-D, against the water hyacinth at the Everglades Station and have been highly pleased with the results that have been obtained to date as have also representatives of the U. S. Engineer Office and of the Board of Commissioners of Everglades Drainage District. More recently spray treatments by airplane have been initiated in cooperation with Officials of the Everglades Drainage District and Airspray, Inc., which have involved the construction and installation of equipment capable of giving good coverage with from 1 to 2 or 3 gallons of total application per acre.

While we would not presume that the formulation or formulations now in use on a sub-operation scale or the rate and time of treatment are the last word, it does look at the present time as if a satisfactory kill can be obtained for five dollars per acre, or perhaps slightly less, on areas where free and ready access by plane is possible. The standard or basic rate of treatment that has been adopted is that recommended by a number of manufacturers, namely, 1,000 parts per million of the chemical at a rate of about 200 gallons per acre, or its equivalent in more concentrated forms. As has been commonly found, formulations using an oil base rather than those in water solution are more effective while applications in the form of dust seem to be the least effective of all.

It is hoped we may be able to push this work quite rapidly for the next few weeks especially in view of the series of hearings on hyacinth eradication that has been announced by the U. S. Engineer Office in Jacksonville under the direction of Colonel A. B. Jones to be held in various parts of the State.

(Continued on page 17)



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Reports Of Our Field Men . . .

POLK COUNTY
J. M. (Jim) Sample

This County is the scene of a great deal of action at this time and will remain that way until the end of the fruit season. Growers are very busy with their fall application of fertilizer, getting their groves cultivated and doing the many other operations that are necessary at this time. Packing houses are now about ready to run at full capacity and we have some very nice fruit in the territory to be shipped to the northern markets. The recent hurricance had everyone very much worried but I am glad to report that we were damaged only very lightly. There was some grapefruit blown from the trees and of course some of the oranges were thorn pricked and bruised to the extent that we are now having some orange droppage.

NORTH CENTRAL FLORIDA
V. E. (Val) Bourland

There was some damage to our fruit crop by the recent hurricane but we are so thankful that the loss was so light that we do not even discuss the few fruit that is now on the ground or that will drop later because of bruises . . . We are well under way with our fall fertilizer and this operation will continue into December. Growers have their properties in excellent condition and as previously reported we have one of the finest quality crops that we have ever produced. Vegetable growers are going forward with their plantings and it now appears that we will probably have a somewhat increased acreage over that planted last year.

SOUTHWEST FLORIDA
Eaves Allison

Well, the hurricane missed us in this section, but some fruit was blown off in the Wauchula-Arcadia area and in the Fort Myers sections by the high winds. However, the damage that I have seen is light. Rains accompanying the disturbance were heavy in some areas and light to medium in others. Ruskin and Palmetto got some excess, but Sarasota and east had just enough to give everything a good watering. Fruit is coloring up earlier than usual but is slow in passing the maturity tests. Buying is slow and cautious with everybody kind of feeling their way along. Groves are looking extra good with most growers planning to apply their fertilizer in late October and early November. Vegetable plantings are coming along in fair shape, with some diasppointment in cucumber harvest and returns.

SOUTH POLK & HIGHLANDS COUNTIES
R. L. (Bob) Padgett

As usual it seems that this section is the pet area for the wind to blow strongest during the hurricane season. We have heard from other parts of the state and from all the information that we can gather it seems that we had as much damage as any other part of the fruit belt. While the loss of grapefruit was not heavy we do estimate that we lost from 5 to 25 percent of the crop which was already light. The orange loss will come from fruit that was thorn pricked and will drop from this cause. This is especially true in the case of Hamlin oranges with their very delicate skin. The hurricane brought very little rain during the past thirty days. Practically all packing plants are operating to some extent in this section and within the next week or ten days will see them going to full capacity. Our fall application of fertilizer is well under way and should be completed by the first of December.

HILLSHOROUGH & PINELLAS COUNTIES
C. S. (Charlie) Little

We have our fertilizer application well under way and this will be completed by the middle of December. Groves are being cultivated very thoroughly and in many cases the growers are plowing their properties. This plowing operation seems to be very beneficial in aiding in this section and in many cases it has been necessary to come in with what could be called an early fall oil spray. We have found that it is not very wise to go into the winter months with heavy infestations of scale insects. The hurricane did only slight damage in this section. Fruit is now being moved to market in fairly heavy quantities, but within the next few weeks we should see movements pick up and all houses and canning plants running to full capacity. Fruit buyers have been hunting tangerines in every nook and cranny in this territory and paying excellent prices when they were able to buy this variety of fruit.

WEST CENTRAL FLORIDA
E. A. (Mac) McCartney

We started our fall application a little earlier than usual this year and if we can continue this operation without interference we will be through by the latter part of November. Growers are using complete mixture and when we say complete ye mean that they are incorporating into their regular mixtures ample amounts of all the required secondary plant foods. Groves are in tip-top condition and we have a crop of excellent quality fruit. The recent hurricane did practically no damage in this territory. Vegetable growers are busy getting their fall crops planted and it looks as if we will have about the same acreage planted this fall as we had last year. Varieties will be diversified and this is very desirable. Citrus growers have been fortunate this past summer in being able to get their groves thoroughly pruned. A large number of our growers did an excellent job in this respect.

FERTILIZER SPREADER DIVISION

When the fall application of fertilizer got under way the demand for Lyonizer fertilizer spreaders was greatly increased and during the past month or two we have been busy getting these machines into the hands of various growers. The many complimentary comments that we have recently heard tends to confirm the belief that we have one of the finest spreaders for all purposes that could be developed.

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Along with a heap of other folks I was plum scared when the reports of the hurricane was comin' in through the papers and over the radio . . . fact is I dug me one of these here fox holes my kid told me about usin' durin' the war, but I never got to use the durn thing, cause Providence sure took charge of that storm, and instead of there bein' a terrific loss of fruit and property and maybe a lot of folks gittin' killed the wind that did blow scarcely bothered anything. Down in the lower Ridge section some fruit was blown on the ground but even this amounted 'cording to reports to only 5 percent of the grapefruit and much less loss on oranges.

The northern markets is due for a treat this year when they get fruit shipped to 'em from Florida . . . 'cause never in all the years I have been watchin' Florida's citrus crops has there been a finer crop of fruit than we've raised this season. Talk about QUALITY, we sure got it this year. Florida growers are due a lot of congratulatin' this year, and if folks compare our fruit with any other other on the market they'll sure buy Florida fruit whenever they can get it.

Down in Lee county the vegetable growers has found a money crop this year in sweet 'taters. Early in September, 1945, a carload of certified Porto Rico seed was purchased in northern Louisiana. The seed was bedded in mid-September and inside of two or three weeks "Draws" was set in the field. A thousand pounds of 4-8-8 of commercial fertilizer was applied after plantin' and when the taters was harvested about the middle of May the crop was about 300 bushels per acre, gradin' 75 percent No. 1's. Price received was $3.40 to $3.60 per bushel f.o.b. Ft. Myers. Good business we calls it.

Florida has shown a phenomenal growth in its citrus production during the past 25 years. In 1919-20, Florida produced 7,500,000 boxes of oranges. Last season production was 49,800,000 boxes, nearly seven times as much. During the same period, tangerine production rose from a skinny 450,000 boxes to 4,200,000 boxes, an increase of almost 1000 percent. Florida produced 5,900,000 boxes of grapefruit in 1919-20. Last season the figure was 32,000,000 boxes. Seems like they's no end to what the state o' Florida can grow.

Uncle Bill

PROGRESS REPORT ON CHEMICAL WEED KILLER

(Continued from page 3)

to offer in the control of the balsam apple vine (Momordica charantia L). in citrus groves. Most citrus growers are well acquainted with this pest, particularly those in the warmer areas on fairly heavy moist soil. In these warmer areas this vine is a perennial thing, but usually makes little growth during the drier winter months. During the rainy season, however, on good soil it often covers the surface with a mat of vines a foot or more thick. Unless controlled in such areas the vines may entirely cover large citrus trees within a period of 3 or 4 weeks. This shades the tree severely and results in reduction of both quantity and quality of fruit. Trees thus shaded for 2 or 3 months become sparse of foliage and take on somewhat the appearance of a declining tree.

Frequent mowing, combined with hoeing and hand pulling of vines from under and out of the trees where the mower cannot reach, has been the conventional method of control. This is expensive, especially when considerable hand work is involved. New tops sprout from roots left in the soil, and although a vine may be severed from the main root at the crown it may survive because of roots which may have formed at any node along the stem in contact with the soil. The balsam apple seeds prolifically and the seed have a high germination percentage.

Last year the first trials on the control of balsam vine with 2, 4-D sprays were made. The pure chemical, which is not water soluble, was used. It was dissolved first in warmed and melted Carbowax 1500 (polyethylene glycol) which served as the carrier. This mixture was soluble in water. The concentrations used were 500 and 1000 ppm actual 2, 4-D (7 oz. 4-D in 2 lbs. Carbowax / 100 gal. water and 14 oz. 2, 4-D in 4 lbs. Carbowax / 100 gal. water respectively). Spraying was done with a knapsack sprayer. The foliage was sprayed sufficiently to wet without excess drip. The weather was warm and soil moisture fair. These conditions prevailed for at least two months after the sprays were applied. The spraying was done at Lake Alfred, Winter Haven, Port Mayaca, and Davie. In some cases only the vines under the tree were sprayed. In others vines up to and including those on the lower branches were sprayed, while in still others the entire tree with vines in it was sprayed. Both orange and grapefruit trees were included and ranged in size from young non-bearing to bearing trees about ten feet high. Thus not only was the response of the balsam vine but also the response of citrus to 2,4-D tested. In addition a few 3/" diameter sweet orange seedlings free of vines were sprayed and another lot of the same seedlings was irrigated with 1 gallon per tree of 1000 ppm solution of 2, 4-D.

The tops of sprayed balsam vines responded in the same manner and at about equal rate to both 500 and 1000 ppm sprays. Within a day after spraying the leaf blades and petioles were badly curled. By the second day a faint chlorosis was apparent in the leaves and by the fourth day the chlorosis was distinct in all leaves with some starting to die. After about 5 or 6 days the stem started to split longitudinally and became brown. The tops were completely dead within about ten days and with the 1000 ppm spray a foot or so of the main root had become soft, split and was decaying. In two weeks as much of the root system as cuold be conveniently traced was dead or dying on those plants receiving the 1000 ppm solution. Cuttings made from these roots failed to sprout when placed in moist soil in a shady location. The roots of the 500 ppm sprayed plants took between 4 and 5 weeks to reach this same stage. Incidental to these tests it was found that morning glory (Pharbitis spp.) was more easily killed than balsam vine, probably because of the greater density of foliage which caused a greater absorption of 2, 4-D. Spanish needle (Bidens spp.), poke weed (Phytolacca rigida Small & P. Americana L.), elder (Sambucus Simposonii Rehder.). and a number of other species were also found to be susceptible.

A week or so after the tops of balsam vines on some of the plots had died a number of balsam seedlings emerged. It was not definitely known whether these were from soil which had received a direct application of 2, 4-D or not. At any rate, they were sprayed with 2,4-D at 500 ppm when they were about 3 inches high. This caused curvature of the leaves and petioles without killing many seeedlins. Several weeks later after considerable top

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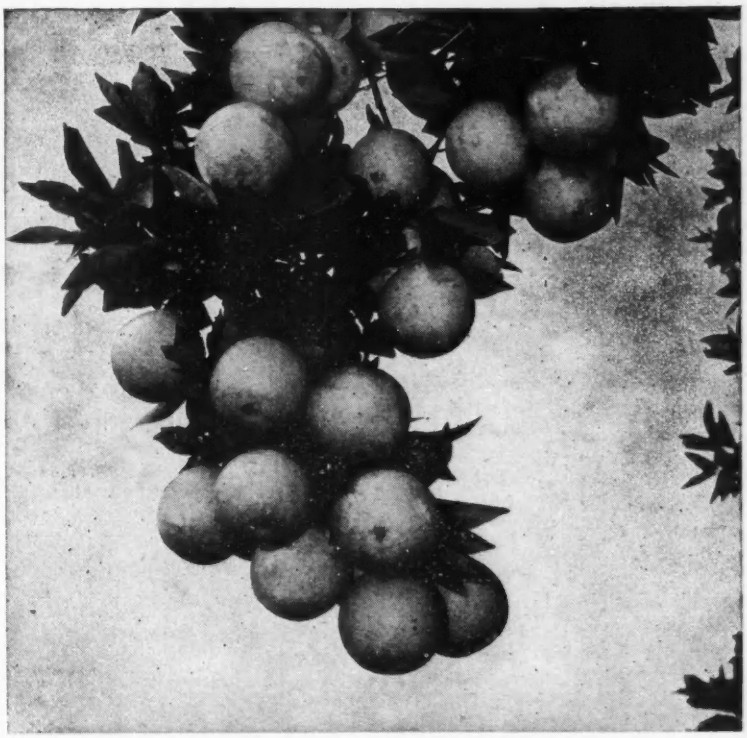
had grown, the same strength solution gave a satisfactory kill. Evidently the very young seedlings did not have enough foliage to absorb a lethal amount of the spray .

The effects of 2, 4-D on citrus observed from these preliminary trials appeared to be at least partially dependent upon the size of the tree as well as the actual amount of 2, 4-D applied. The young sweet orange seedlings sprayed with 1000 ppm solution and those irrigated with this same solution showed a yellowing and curling of leaves and tender shoots within 6 weeks. Shoots started dying back in about 2 months and at the end of 4 months the seedlings in both cases were completely dead. Those sprayed with 500 ppm solution responded more slowly and were less severely affected. On these there was a yellowing and curling of foliage and young shoots, followed by the loss of many leaves and the killing back a foot or so of shoots. Several months later they seemed to have partly recovered for they appeared to be growing almost normally. In no other instances were deleterious effects noted on citrus, regardless of tree size, unless the spray solution came in contact with the foilage. When only a few leaves on the lower branches were sprayed the first response noted was a mottled chlorosis which appeared in about 1 month. This was followed by a slight stiffening or thickening of the leaf blade. Within about 2 or 3 months a splitting and corking of the midrib and most of the primary lateral veins occurred on the upper surface of many leaves. When entire branches or trees were sprayed these same leaf symptoms appeared as well as a distortion of new growth, even though the new growth did not appear until some time after the spray was applied. The most serious damage noted on bearing or near-bearing size trees was the killing back of some young tender growth a foot or more. All these deleterious effects decreased in severity with an increase in tree size, or with a decrease in the actual amount of 2, 4-D applied. No difference in varietal susceptibility was noted at this time except in one case rough lemon root stock shoots were more severely damaged by 1000 ppm spray than was the young shoot growth on the sweet orange top.

The inhibiting effect of 2, 4-D on seed germination was tested. Sunflower seeds (Helianthus L.) were planted in flats containing 3 dif-



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ferent soils; a sand, a sandy loam, and a sandy peaty muck. The original irrigation, which was to saturation, was made on one series with a 1000 ppm solution of 2, 4-D. On the control series it was with tap water. Thereafter tap water was used on both series. Germination in the 2, 4-D treated soil averaged about 1/30 that in the controls. The inhibiting effect on germination was least in the sandy peaty muck and about equal in the other two soils. Germination in the treated soils from subsequent plantings did not approach that in the control series for about 10 weeks during which 11 irrigations to near saturation with tap water were made.

The next trials with 2, 4-D were made the middle of November on a commercial scale in two orange groves on sandy peaty muck soil in the Davie area. The spraying was done on a warm day and the temperatures ranged from warm to cool for several weeks afterward. There was good soil moisture. No rain fell on any plot for at least 20 hours after spraying. The plots included a total of about 11 acres sprayed, plus suitable control plots. A power spray rig was used in the application of the sprays.

One set of plots consisted of six acres of a 5 year old Navel orange grove. The spray was applied at 75-100 pounds gauge pressure through two double Boyce guns fitted with No. 3 discs. Half these trees were sprayed with 500 ppm and the other half with 1000 ppm 2, 4-D solution made up as before with Carbowax. The growth of balsam vines in this grove was what might be termed medium. By spot spraying, covering all the balsam vines up to the lower branches, a satisfactory coverage was secured with approximately 100 gallons of spray solution per acre. Little spray drift was obtained at this pressure. In these plots 4 trees, badly covered with vines, were selected for spraying the entire tree. This was done primarily to test the susceptibility of the variety to 2, 4-D. Each tree was thoroughly wet, two with 500 ppm and two with 1000 ppm solution.

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Another set of plots was laid out in the same 5 year old grove and sprayed in an identical manner except that 2, 4, 5-trichorophenoxyacetic acid was used instead of 2, 4-D. There were reports that the 2, 4, 5-T had, with a few species, given a better kill than 2, 4-D. The method of formulating and the concentrations used were the same as before. The trees receiving 2, 4, 5-T at 500 ppm were Valencias and those receiving 1000 ppm were Navels.

A third set of plots was laid out on an acre of a 15-year old Valencia grove badly infested with balsam vines to a depth of about 1 foot over a considerable portion of the area. Many trees were rather heavily loaded with vines. The spray pressure here was increased to 300 pounds and two 6-nozzle broom guns fitted with No. 4 discs were used. Spraying was done as rapidly as the spray hands could walk and sweep the vines with spray up as far as the lower branches. Half the trees were sprayed with 500 ppm and the other half with 1000 ppm 2, 4-D. The tops of two trees covered with vines were completly sprayed, one with the 1000 ppm solution and the other with 500 ppm. Slightly over 200 gallons of spray solution were used on this acre. Spray drifted a row or so from the point of application at the pressure used here.

Frequent inspection of these plots was not convenient. When they were visited 3 days after spraying the response of balsam vine appeared to be about the same for the 2 different strengths of both 2, 4-D and 2, 4, 5-T. Perhaps curling and chlorosis of the leaves was slightly farther advanced in the last grove where more solution was applied at the higher pressure. At this time it was also observed that young succulent elder sprouts were badly curled and that the "needles" of Australian pine (Casuarina lepidophloia) root suckers along the windbreaks where spray had been applied were becoming chlorotic. At the end of a month the tops and most of the roots of practically all the balsam vines in all plots were dead, so far as could be determined, except in those cases where the vine tops were in trees above the level to which spray was applied. Almost as important in some restricted sections of these groves as the kill of balsam was the kill of elder sprouts. Young succulent canes had apparently been killed completely unless they had originated from large old roots. The large woody canes were killed back a couple of feet, but later sprouted new tops. Old roots with tender tops were killed back a foot or so from the crown. New tops later developed on some of these. Less regeneration of elder occurred at the higher spray concentration. Australian pine suckers about 1/8" to 1/4" in diameter were killed back to the mother root. Larger ones were completely defoliated and killed back to a point on the stem about 1/4" in diameter.

At the time the second inspection was made no very marked effects from the sprays were apparent on the citrus trees. Those trees which had been completely covered with spray were slightly chlorotic and there was some distortion of new growth. By mid-January many of the leaves on the lower branches which had been sprayed and leaves on those trees sprayed completely, particularly the 5-year old Navels, were showing the characteristic mottled chlorosis with the splitting and corking of midribs and veins mentioned earlier. Sporadic flushes of growth were appearing with an upward curling of the new leaves where spray had been applied directly to the foliage of young trees. The old trees were showing these same symptoms but to a lesser degree. At this time there appeared to be no difference in the response of citrus to 2, 4-D and 2, 4, 5-T

(Continued on page 18)

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Heads State Canners Association

C. Rouss May, Southern General Manager of The Hills Brothers Company, recently re-elected President of the Florida State Canners Association.

Vast Expansion Of Canning Industry

Every war since the Napoleonic era has resulted in the increased popularity and wider public acceptance of canned foods, Carlos E. Campbell, Secretary of the National Canners Association, Washington, D. C., told members of the Florida Canners Association attending their 15th Annual Convention at the Sheraton-Plaza Hotel, in Daytona Beach, Oct. 11. The speaker appeared on the progrem with Fred A. Stare, Columbus, Wis., canner and President of the National Canners Association, and Allen Walker, N.C.A. Director of International Trade Service.

"Immediately preceding World War I, only 67 million cases of canned fruits and vegetables were consumed annually in the United States, however, consumption for the first year following the Armistice jumped to 90 million cases, and, with one exception, has been increasing ever since—an enviable record indeed for any industry," Mr. Campbell declared. "And even more startling," he said, "is the record for World War II. Before the war, the average consumption of canned fruits and vegetables had grown to slightly more than 250 million cases, yet barely a year has passed since the Japanese surrender and the annual consumption of canned fruits and vegetables is expected to reach nearly 500 million cases, or about twice as much as was consumed before Pearl Harbor.

"Canned citrus products are an excellent example of the ever-growing popularity and acceptance of canned foods. During the year prior to World War II, slightly less than 20 million cases of Florida citrus products found their way into consumptive channels. Today, not five years since December 7, 1941, an established total of about 50 million cases of Florida's canned citrus probably will be canned here and abroad—a record of achievement," Mr. Campbell said, "Florida canners can be rightfully proud".

THE SIGNIFICANCE OF WATER CONSERVATION IN THE AGRICULTURAL DEVELOPMENT OF SOUTH FLORIDA.*

(Continued from page 11)

Regardless of when, how and to what extent this tremendously important problem of water conservation and handling is undertaken in South Florida, two needs must be simultaneously appreciated and actively met. The first of these is a comprehensive study of the problem and cereful planning of procedure from every standpoint; the second is the attainment of public support which can only be gained as the result of an active program of educational meetings conducted for this purpose. Both are vital and preferably should be developed simultaneously. At least this is the approach that is being made in the development of the unit plans for the Hillsboro and West Palm Beach Canals in the Upper Glades; and we believe we are making progress. If successful I am confident an effort will be made to use this approach in other sections of the Glades. Certainly there is no other basis apparent at the present time for effective planning of this nature which would eventually bring adequate water supplies for every conceivable purpose so completely into the service of South Florida's multilateral development as this "All-weather" approach.

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Soil Conservation And The Fertilizer Program . . .

The close relationship between soil conservation and the use of fertilizer was called to national attention recently by Secretary of Agriculture Clinton P. Anderson.

"Farmers are using more and more lime and fertilizer in their soil conservation program, and they are getting less and less of it through Government distribution," declares the Secretary in the current issue of the **Fertilizer Review,** quarterly publication of the National Fertilizer Association.

"Our policy is to abandon contract purchases wherever suitable arrangements can be made. But that is a detail. The emphasis on use of lime and fertilizer will continue. It is basic to any comprehensive soil conservation program. It is basic to good farming.

"The nation is using far more plant food material than ever before, but it is not using nearly enough to restore and improve its soils.

"Our needs require that we work together for continuation of a strong program of soil conservation, for expanded research and education, and for good farm income. We need to work for our future.

"And let us remember that fertilizer used for soil conservation and better balanced farming is fertilizer for the future of America."

PROGRESS REPORT ON CHEMICAL WEED KILLER

(Continued from page 16)

when applied at equal concentrations. After about three months there had been a considerable loss of leaves and some small branches and died back on the 5-year old trees where foliage was sprayed. New twig growth and leaves were continuing to curl in some instances. The curled leaves evidently were ideal for the establishment of aphis colonies as many were still further curled by these insects. At this stage the most severe damage to citrus apparently resulted on the 5-year old Navels from 2, 4 5-T at 1000 ppm and the next most severe from 2, 4-D at 1000 ppm. The Navels and young Valencias sprayed with 500 ppm 2, 4, 5-T and 2,4-D were only slightly damaged. No severe leaf shed or shoot killing was observed in the 15-year old Valencias as a result of the 2, 4-D sprays. In no case was there evidence of damage to citrus except where the sprays had come in contact with foliage. Generally where either of these sprays at either concentration was applied to citrus foliage bloom appeared earlier on the sprayed portions than on the unsprayed portions of the same tree or on adjoining unsprayed trees. The sprayed trees or portions of trees also made shoot growth slightly earlier and continued with scattered bloom and growth flushes at least until May, when the last inspection was made. Some bloom even occurred on the distorted young flushes. Little fruit set on any of this scattered bloom. Before making appreciable growth it became maliformed, turned yellow and shed, or sometimes dried and remained on the tree. Frequently on Navels, the first stems and calyxes would remain green and enlarge after the fruits and shed. Fruit shedding was much

(Continued on page 20)

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PROGRESS REPORT ON CHEMICAL WEED KILLER

(Continued from page 18)

more severe with Navels than with Valencias. Fruits which did set on sprayed portions of Navel trees often became ovate, obvate, pyriform, flattened, or otherwise misshapen. These malformed fruits were coarse and rough with the pistil usually persistent and frequently enlarged. With the exception of the persistent pistils, malformations were relatively scarce with Valencias, and the coarseness lessened with each succeeding flush and by May some flushes were practically normal in appearance.

The result of all tests thus far had indicated there was no practical reason for using compounds at strengths greater than 500 ppm of the actual acid for the control of the balsam vine and several undesirable weed species found in citrus groves. Furthermore, there was some evidence that less damage resulted on citrus at the lower concentration, as indicated particularly by the response of the 5-year old Navels. It was also obvious that spray should be confined to the weed species around and under the trees. As little spray as possible should come in contact with citrus foliage. Although there was no clearcut evidence from these trials that damage was done to citrus by spray drift, there are such reports from California. Very young trees might be seriously damaged in this manner. As pointed out earlier, damage to citrus appears to be somewhat in proportion to the size of the tree as well as the actual amount of the acid coming in contact with the foliage—and perhaps with the growing roots.

There was no evidence that 2, 4, 5-T offered any advantage over 2, 4-D in weed eradication. On the other hand, it appeared to be somewhat more deleterious to citrus. Since it is a much more expensive material and more difficult to secure than 2, 4-D, its use in this field is not justified. No further trials with it were made.

In late April, at the time of the last inspection of the plots at Davie, grass and weeds were beginning to grow on many of the areas where balsam vines had shaded out all other growth previously. Balsam vines were coming back, apparently mostly from seed, rather abundantly in many of the sprayed plots. Little or no difference could be seen in the amount of balsam regeneration as a result of the various treatments. In some instances this regeneration was about as severe as on adjoining mowed areas except there were fewer vines in the trees where the sprays were used. From this it was evident that a series of treatment swould be necessary for satisfactory control of this vine.

This presents several questions which can only be answered by further investigation before qualified recommendations can be made for or against the use of 2, 4-D sprays in citrus groves. Will 2, 4-D accumulate in our citrus soils in amounts sufficient to damage citrus roots more than would cultivating for the same degree of control? If so, will the number of applications required for satisfactory weed control be sufficient for such an accumulation? Can 2, 4-D be absorbed by undamaged roots and transported to the tops where damage might result? Can it be applied readily and yet avoid a harmful amount of spray drift? Do different varieties have different degrees of susceptibility? Will it be more harmful to desirable cover crop species than the good derived would warrant? Is it definitely not harmful to animals and humans? Then if the answers to these are

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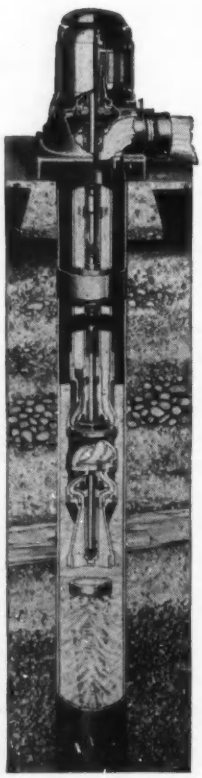

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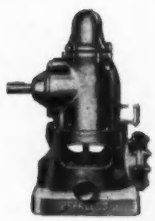

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favorable; when, how, what formulation, at what concentration, under what conditions can it be best applied? Will it be more economical than the conventional methods of weed control?

We have partial answers to some of these questions and can speculate somewhat intelligently on the others. If sprayed under conditions of good soil moisture and with the amount now indicated as necessary for weed control, it seems improbable that accumulation of 2, 4-D in the soil would become great enough to damage plants.

To illustrate: take a hypothetical case on a light sandy soil. From 1.5 to 2.0 pounds of actual 2, 4-D per acre application should be sufficient for controlling a very heavy weed growth. If properly sprayed most of this would be retained on the weed foliage and would break down into its harmless constituents before it reached the soil. Assume, however, for the sake of argument, that it did all reach the soil in its active state. Assume also that it was all carried into the surface 6 inches of soil and no further by a light rain. Assume further that this material remains in the active state until the soil has dried down to the wilting point. In a sand under these extreme conditions, the concentration might be about 75-100 ppm in the soil solution. If any roots survived in this dry soil they might be damaged by the 2, 4-D or absorb enough of it to damage tissues elsewhere in the plant. The sweet orange seedlings irrigated with a 2, 4-D solution give some evidence that it was transplanted from the roots to the tops where damage was done. If all the 2, 4-D concentrated in the surface inch or so where the soil moisture was likely beloy the wilting point the concentration would be greater. But there would likely be no roots surviving at this moisture content to be damaged or absorb 2, 4-D for transport elsewhere. In a sand with fair soil moisture the concentration would be reduced to a fraction of the above figures. In

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the heavier soils the concentration would be even lower. Under certain extreme conditions with very sensitive plants, however, some damage might result if concentrations considerably lower than we now have reason to suspect are deleterious.

(Concluded next issue)

ADMINISTRATIVE COMMITTEES NAMED

Members of two citrus administrative committees for federal orders regulating the handling of lemons and oranges in California and Arizona, have been appointed by the U. S. Department of Agriculture.

Both committees will serve during the two-year period beginning November 1, 1946. Their principal function is to recommend to the Department the quantity of lemons or oranges which should be shipped weekly in interstate commerce and to Canada, officials said.

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, AND MARCH 3, 1933, OF THE CITRUS INDUSTRY, PUBLISHED MONTHLY AT BARTOW, FLORIDA, FOR OCTOBER 1, 1946

STATE OF FLORIDA.
COUNTY OF POLK,

Before me, notary public in and for the State and county aforesaid, personally appeared S. Lloyd Frisbie, who having been duly sworn according to law, deposes and says that he is the Business Manager of The Citrus Industry and that the following is to the best of his knowledge and belief, a true statement of the ownership, management, (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March, 1933, embodied in Section 537, Postal Laws and Regulations, printed on the reverse side of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher — Associated Publications Corp., Bartow, Fla.

Editor—S. L. Frisbie, Bartow, Fla.

2. That the owners are:

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S. LLOYD FRISBIE,
Business Manager.

Sworn to and subscribed before me this 30th day of September, 1946.
(SEAL) A. G. MANN,
Notary Public.